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CITATION:

NISHIO, ISAO. Mesenteric Lymph Node Reaction and Prognosis of Gastric Cancer. 日本外科宝函 1964, 33(3): 561-580

ISSUE DATE:

1964-05-01

URL:

http://hdl.handle.net/2433/205728

Mesenteric Lymph Node Reaction and Prognosis of Gastric Cancer

by

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Received for Publication Feb. 3, 1964

Contents

I. Introduction

Since BILLROTH[7] reported, in 1881, his first success in gastrectomy for gastric cancer, the operative indication to this disease has been largely extended together with the advances in the operative procedures, anesthesiology and pre- and post-operative managements. Nowadays, the radical operations for gastric cancer such as extensive or total gastrectomy with or without resection of the neighbouring organs including cleansing of lymph nodes

are generally performed, however, their therapeutic effect is not satisfactory yet. Gastric cancer is regarded as a cureless disease for the reason that a five year survival even after a radical gastrectomy amounts at most 30 per cent[28]. On the other hand, there have been not a few reports[20] of the observations of long survivals and spontaneous healing even in cases of palliatively operated gastric cancer in the late stadium, which are not explicable to clinicians. Study on the prognosis of cancer is, therefore, very important in order to ascertain the adequacy of the treatments for cancer. Numerous studies have been devoted to cancer and its prognosis. BRODERS[13][14][15] made extensive studies on the prognosis of cancer from the standpoint of cell differentiation, and KAGITANI[28], LEE[31], PLAUT[40] and others insisted a significant relationship between the clinical pictures of cancer patients and the prognosis. IMAI[27] postulated his original CPL-classification concerning the prognosis, as a result of study on proliferation of connective tissue at the marginal area of cancer growth. BERG[6] reported the cases of favorable prognosis which showed infiltration of plasma cells and histiocytes in the surroundings of the primary tumor.

Recently, there is an attempt to decide the prognosis of cancer patients, not from the histological findings of the primary tumor, but from the reactions of the regional lymph nodes of the tumor. BLACK[8][9][10][11][12] asserted that longer survival in cancer patients was associated with the presence of sinus histiocytosis in the regional lymph nodes, which was regarded as a histological manifestation of host resistance to tumor exerted by the reticuloendothelial system. In opposition to BLACK[8][9][10][11][12], BERG[5][6] and MOORE[33] maintained that sinus histiocytosis cannot be accepted to be a prognostic sign in cancer patients. In this country also, discussions have been done pro[37] and con[30] over postulation of BLACK. While the prognosis of cancer patients can be guessed from the viewpoint of above mentioned pathological and clinical factors, the newly arising attempt to decide the prognosis of cancer patients from the reactions of lymph nodes as an organ of the reticuloendothelial system includes the important problem of reconsidering cancer in terms of the host-tumor relationship.

In recent years, it has been demonstrated that increased polysaccharide in the serum of cancer-bearing organisms and in the stroma of the progressively growing marginal area of the cancer tissue is associated with higher malignancy of the tumor[16][18][23][29][39]. Debating the prognosis of the disease, it is very interesting to examine whether or not this fact is applicable to the lymph node of cancer patients. In this respect, the present paper describes the interesting results of the histological and histochemical experiments which have been undertaken with the lymph nodes of gastric cancer in relation to the prognosis.

II. Clinical Experiment

1. Materials

In the present study 202 lymph nodes were used: 94 primary regional nodes from 53 cases of gastric cancer operated on, none of which died within a month postoperatively 53 inferior mesenteric lymph nodes, a single node from each case, and as control, 30 inferior mesenteric lymph nodes and 25 superior mesenteric lymph nodes from 30 cases of non-cancerous gastric diseases (10 cases of gastritis, 19 of gastric ulcer and 1 of gastric granuloma). The mesenteric lymph nodes were collected from the mesenterium of the

bowel about 2.5 m and 3.5 m distant from the Treitz's ligament towards the anus, and the nodes taken from each location was called superior and inferior mesenteric lymph node respectively. All the cases of gastric cancer and non-cancerous gastric diseases studied in the present experiment were subjected to the operation at our surgical clinic during the period from December, 1961 to March, 1963 and all the resected stomachs were routinely ascertained histologically.

2. Methods

The lymph nodes obtained at surgery were immediately fixed in absolute alcohol for 24 hours and paraffin sections of 6 microns in thickness were prepared in duplicate from 3 longitudinal planes covering that of the hilum. One of these duplicate sections was stained with hematoxylin and eosin for the histological study, while the other was stained by the periodic acid-Schiff (PAS) method for the histochemical study of examining the presence of polysaccharide. The oxidation process of the periodic acid-Schiff method was carried out in 0.5 per cent potassium periodate, containing 1/10 normal hydrochloric acid in 24 per cent. All the procedures of the PAS method were carried out carefully excluding water in order to avoid outflow of watersoluble polysaccharide.

The postoperative follow-up information on the individual cases was obtained from the records during the hospitalization and return postcards. The information was obtained in 97 per cent of this series. By this follow-up study, survival and, in the cases of death, the cause and date of death could be well pursued.

3. Results

A. Histological reaction of lymph nodes

i) Criterion for lymph node reaction

For the study of lymph node reaction, the hematoxylin and eosin stained sections were systematically examined with regard to the hyperplasia of sinus reticulocytes (Sinus Reticulosis) and hyperplasia of lymph follicles (Follicular Hyperplasia). The feature of sinus reticulosis, referred to as R. hereafter, is characterized by a moderate or marked dilatation of the subcapsular and intermediate sinus containing many hyperplastic reticulocytes. Almost all nodes of this pattern appeared to have the hyperplastic reticulocytes pressing against follicles, but the sinus was markedly lined out from the follicles by the retothelium (Fig. 10 and 11). The feature of follicular hyperplasia, referred to as F. hereafter, is characterized by increase in number of hyperplastic follicles found uniformly including secondary center with mitotic figures in it (Fig. 12 and 13). The lymph node having the feature of sinus reticulosis or follicular hyperplasia was described as R (+) or F (+), and the node having none of these features was described as R (−) or F (−), respectively. Moreover, the reaction of the node having both R (+) and F (+), or either R (+) or F (+) was called the reactive pattern and that of the node deprived of these both features was called the non-reactive pattern (Fig. 8 and 9).

ii) Reaction of the non-metastasized regional lymph node in gastric cancer and the prognosis

Forty-four non-metastasized lymph nodes were obtained from the primary regional portion of 53 gastric cancer cases, and the lymph node reaction was studied in relation to the prognosis. It seemed that the non-reactive pattern was found somewhat frequently in

12 to 15 month postoperative survivals, however, no definite correlation could be found between the reactive and non-reactive pattern in regard to the length of postoperative survival so long as the non-metastasized regional lymph nodes are concerned. In consequence, it was assumed that the findings of the regional lymph nodes can not be employed for the prognostic inference (Table 1).

Table 1. Reaction of non-metastasized regional lymph node in gastric cancer and the prognosis

Reaction	No. of death	No. of survival
Reactive	8	9
Non-reactive	8	19

iii) Reaction of mesenteric lymph node in non-cancerous gastric diseases

Mesenteric lymph nodes obtained from 30 cases of non-cancerous gastric diseases were examined as control. In order to examine the possibility of various combinations of the above mentioned lymph node reaction depending on the site of lymph node exstirpated, 50 lymph nodes obtained respectively from the superior and inferior portions of mesenterium of 25 cases in duplicate were examined. Findings of the superior and inferior mesenteric lymph nodes were similar with each other in 21 cases out of 25 (84%), and different in 4 cases out of 25 (16%). As to the superior mesenteric lymph nodes, 17 cases out of 25 (68%) showed the non-reactive pattern, and 8 cases out of 25 (32%) showed the reactive pattern. As to the inferior mesenteric lymph nodes, 26 cases out of 30 (86.7%) showed the non-reactive pattern and 4 cases out of 30 (13.3%) showed the reactive pattern (Table 2).

Table 2. Reaction of mesenteric lymph node in non-cancerous gastric diseases

Reaction	Incidence of reaction in superior mesenteric node	Incidence of reaction in inferior mesenteric node
R(−)F(−)	17 (68%)	26 (86.7%)
R(+)F(−)	8	4
R(+)F(+)	0 (32%)	0 (13.3%)
R(−)F(+)	0	0

iv) Reaction of the mesenteric lymph node in gastric cancer and the prognosis

As has been already mentioned, the inferior mesenteric lymph node is less influenced by benign gastric diseases. In the cases of gastric cancer, therefore, only the inferior mesenteric lymph nodes were studied (hereafter, the mesenteric lymph node refers to the inferior mesenteric one).

The reactive pattern was observed in the mesenteric lymph node of 26 out of 46 cases (56.6%) of gastric cancer. This frequency is greater, when compared with that of reactive pattern of 13 per cent in the non-cancerous gastric diseases. Of the nodes with the reactive pattern, F (+) reaction was observed in only one case and most of others showed the reactive pattern of R (+) type (Table 3).

Concerning the prognosis of these cases, gastrectomy could be performed in 49 out of 53 gastric cancer cases subjected to laparotomy. In 7 cases out of 49, metastasis in

Table 3. Reaction of inferior mesenteric lymph node in gastric cancer

Reaction	No. of cases		Incidence (%)	
R(−)F(−)	20		45.5	
R(+)F(−)	18		39.1	
R(+)F(+)	7	26	15.3	56.5
R(−)F(+)	1		2.2	

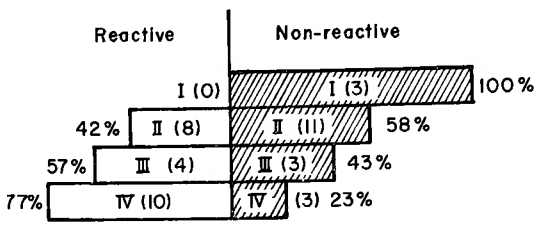
the mesenteric lymph node was observed. All these died within 7 months after the gastrectomy with the average of a little more than 3 months. The reactive pattern was observed in 22 cases out of 42 with no metastatic invasion. Of these 22, 20 cases (89.9%) died within 3 months after gastrectomy ; only the remaining 2 cases (9.1%) are still alive at the moment of 12 to 15 months after gastrectomy. On the other hand, 20 cases out of 42 presented the non-reactive pattern. Among these 20, 5 cases (25%) died within 7 months, but the remaining 15 cases are still alive, at the time of writing this paper, 12 to 15 months after gastrectomy. Four cases out of original 53 were highly advanced cases and rejected gastrectomy. All of them revealed the reactive pattern and died within 1 to 4 months after the operation (Table 4).

Table 4. Reaction of mesenteric lymph node in gastric cancer and the prognosis

	No. of total cases	No. of death	No. of survival
Gastrectomized Group	49		
Metastasis positive	7	7 (100%)	0
Metastasis negative	42		
Reactive	22	20 (89.9%)	2 (9.1%)
Non-reactive	20	5 (25.0%)	15 (75.0%)
Non-gastrectomized Group	4		
Metasis positive	0	0	0
Metastasis negative	4		
Reactive	4	4 (100%)	0
Non-reactive	0	0	0

Fig. 1

Mesenteric lymph node reaction and progress of gastric cancer.



I, II, III & IV each representing a stage according to the classification of Gastric Cancer Research Group. The larger the number, the more advanced. The figures in parentheses indicate the number of cases.

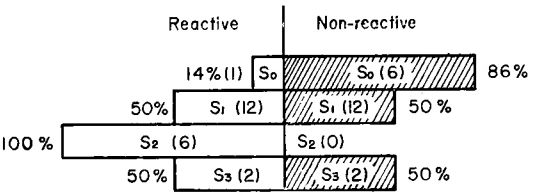
v) Reaction of the mesenteric lymph node, stage of gastric cancer and general condition

The relationship between the reaction of the mesenteric lymph node in gastric cancer and the local findings at the operation or the pre-operative general condition were studied. As shown in Fig. 1, all cases of the stage I showed the non-reactive pattern, while almost all of the cases of the stage IV showed the reactive pattern. (The stage I or IV was termed after the agreement of Japanese Gastric Cancer Re-

search Group). Accordingly, it was assumed that the more the advancement of gastric cancer, the more frequently the reactive pattern appeared. As the factors determining the stage, however, the grade of infiltration to the serosa (Fig. 2) and that of the lymph node metastasis (Fig. 3) had little correlation to the lymph node reaction, regardless of reactive or non-reactive. There was the tendency that the higher the degree of peritoneal dissemination or that of liver metastasis existed, the higher the percentage of the appearance of reactive pattern (Fig. 4 and 5).

Fig. 2

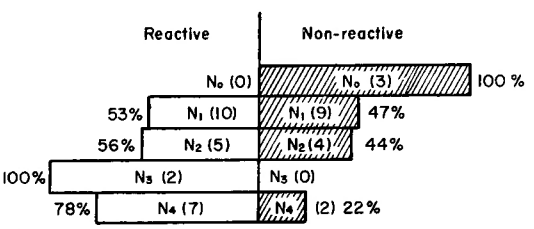
Mesesteric lymph node reaction and degree of cancer cell infiltration into gastric serosa



S_0, S_1, S_2, & S_3 each representing a degree of cancer cell infiltration into gastric serosa according to the classification of Gastric Cancer Research Group. S_3 the highest degree. The figures in parentheses indicate the number of cases.

Fig. 3

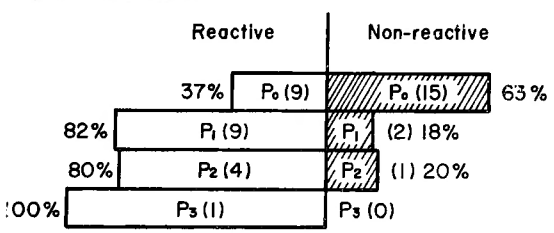
Mesenteric lymph node reaction and degree of lymph node metastasis



N_0, N_1, N_2, N_3 & N_4 each representiog a degree of lymph node metastasis according to the classification of Gastric Cencer Research Group. N_4 the highest degree. The figures in parentheses indicate the number of cases.

Fig. 4

Mesenteric lymph node reaction and degree of peritomeal dissemination



P_0, P_1, P_2 & R_3 each representing a degree of peritoneal dissemination according to the classification of Gastric Cancer Research Group. P_3 the highest degree. The figures in parentheses indicate the number of cases.

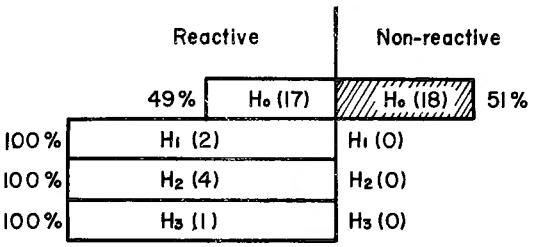
As factors indicating the pre-operative general condition, the amount of serum protein and the value of the BSP retention test were examined. They were found, however, to have no correlation with the reaction of the mesenteric lymph node (Fig. 6 and 7).

vi) Reaction of the mesenteric lymph node and the prognosis after curative and non-curative operations

Forty-two of cancer patients in whom the mesenteric lymph node metastasis was not found at the time of gastrectomy were divided into the curative operation group and non-curative operation group according to the agreement of the Gastric Cancer Research Group in this country. The relationships between the prognosis and the reaction of the mesenteric lymph node in these two groups were summarized in Table 5. Nineteen cases out of 42 were curative. Of these 19, 13 cases were non-reactive and are still alive at the time of writing this paper 12 to 15 months after the operation; whereas 5 of the 6 reactive cases died within 8 months and only a single remaining case is still alive after 13 months. Of 23 non-curative operations, 16 cases revealed the reactive pattern, 15 of which died within a year. In spite of the reactive pattern of R (−) F (+) type in a single case, the patient is still alive after more than a year postoperatively. There were 7 non-reactive

Fig. 5

Mesenteeic lymph node reaction and degree of liver metatsasis



H_0, H_1, H_2 & H_3 each representing a degree of liver metastasis according to the classification of Gastric Cancer Research Group. H_3 the highest degree. The figures in parentheses indicate the number of cases.

cases among the 23 cases of non-curative operation. Five of them died within a year and the remainder of 2 cases are still alive at the moment of 12 to 15 months after the surgery.

vii) Summary

Fifty-three cases of gastric cancer operated on were divided into 3 groups according to the reaction of the inferior mesenteric lymph node; (1) metastasis group, (2) non-metastasis group with the reactive pattern, and (3) non-metastasis group with the non-reactive pattern, and the prognosis of each group was studied. (1) All of the metastasis group died within 7 months after the operation, (2) majority (90%) of the non-metastasis group with reactive pattern died within a year after the operation, (3) not a few (75%) of the non-metastasis group with the non-reactive pattern are atill alive according to the observation of 12 to 15 months. Particularly, all cases of non-reactive pattern with the curative operation are all alive and

Fig. 6

Mesenteric lymph node reaction and serum protein content.

(Clinical data)

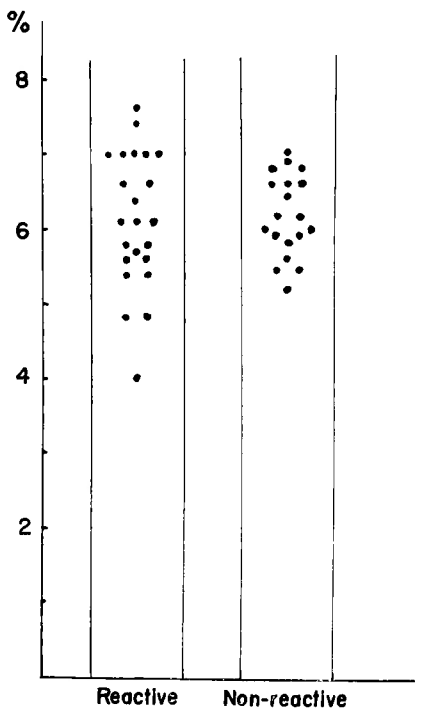


Fig. 7

Mesenteric lymph node reaction and BSP retention at 30th minute.

(Clinical data)

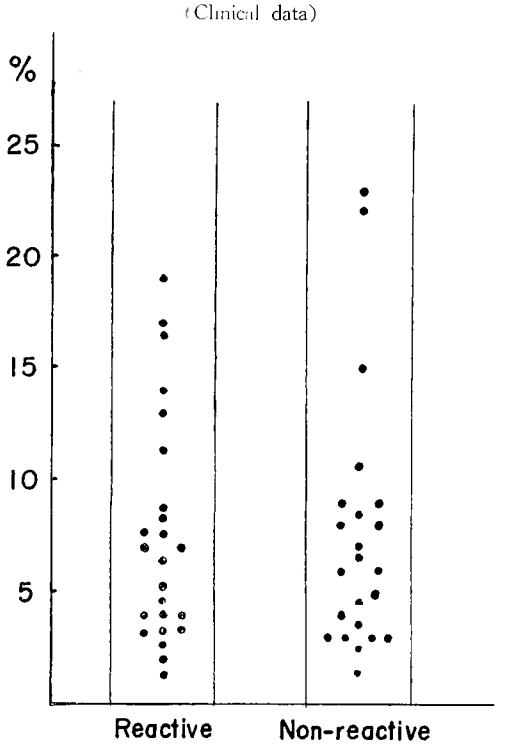


Table 5. Reaction of mesenteric lymph node and prognosis after curative and non-curative operation for gastric cancer

Op. performed	Reaction	No. of death		No. of survival	
Curative Op. (19 cases)	R(−)F(−)	0		13	
	R(+)F(−)	4		1	
	R(+)F(+)	1	5	0	1
	R(−)F(+)	0		0	
Non-curative Op. (23 cases)	R(−)F(−)	5		2	
	R(+)F(−)	11		0	
	R(+)F(+)	4	15	0	1
	R(−)F(+)	0		1	

are expected to have a favorable prognosis. As regards the stage of gastric cancer, it is assumed that peritoneal dissemination and liver metastasis have an important significance. Of the reactive patterns, sinus reticulosis showed more close correlation to the prognosis than follicular hyperplasia.

B. Histochemical reaction (PAS)

The following lymph nodes were stained by the PAS method; 50 of metastasized primary regional lymph nodes from 25 cases of gastric cancer, 42 non-metastasized mesenteric lymph nodes from 42 cases of gastric cancer and 25 inferior mesenteric lymph nodes from 25 cases of non-cancerous gastric diseases. Eight sections of gastric cancer tissue from 8 cases were also stained by the same method.

i) PAS reaction of gastric cancer tissue

The cases of gastric cancer examined here were all adenocarcinoma and the acini often contained homogenous substance of PAS positive. Many of the cancer cells constituting the acinus had PAS positive granules, at the same time a few PAS negative cancer cells being scattered among them. In 7 cases out of 8 of adenocarcinoma of the stomach, the marginal area of the cancer tissue was more readily PAS stained than normal gastric one and dotted with fairly large round cells including PAS positive granules. The remaining single case was accepted to be PAS negative with little difference in appearance of PAS staining from non-cancerous gastric tissues.

ii) PAS reaction of the metastasized regional lymph node in gastric cancer

Two metastasized primary lymph nodes were collected from each of 25 cases of gastric cancer, number of the collected lymph nodes reaching 50, in all. In thirty-eight of them (76%), strongly PAS-stained stroma was observed around the cancer growth which was accompanied by many reticulocytes containing PAS-positive granules (Fig. 14 and 15). Remaining 12 nodes (24%) were PAS-negative.

iii) PAS reaction of non-metastasized lymph node

a) Criterion for the PAS reaction of non-metastasized lymph node

Following findings were employed as criteria for the PAS reaction; 1) an increase in reticulocytes with active phagocytosis of strongly PAS-positive rough granules within the sinus and follicle (Fig. 16 and 17), 2) strong PAS-staining of reticulum fibers and ground substance in the sinus (Fig. 15). If either of 1) or 2) was noticed, the specimen was described as PAS (+), if deprived of both, it was PAS (−). As the cells including

phagocytic granules in the secondary center, fibers of capsule, trabecule and medullary cord are physiologically found to be PAS positive, these findings were not employed as criteria for the PAS reaction. Furthermore, the PAS reaction in the present experiment was not altered by the saliva-test.

b) PAS reaction of non-metastasized regional lymph node of gastric cancer and the prognosis

Twenty-nine non-metastasized regional lymph nodes from each of 29 cases of gastric cancer were studied. Finding of PAS-negative was a little more frequently observed in the survival cases of 12 to 15 month observation, although it was difficult to obtain decisive prognostic judgement from the findings of PAS reaction (Table 6).

Table 6. PAS reaction of non-metastasized regional lymph node in gastric cancer and the prognosis

PAS reaction	No. of patients died within a year after gastrectomy	No. of patients surviving 12-15 months after gastrectomy
PAS (+)	5	5
PAS (−)	7	12

c) PAS reaction of mesenteric lymph node in non-cancerous gastric diseases

Of 25 inferior mesenteric lymph nodes examined, 7 (28%) were PAS-positive and 18 (72%) were PAS-negative.

d) PAS reaction of the mesenteric lymph node in gastric cancer and the prognosis

Of 42 non-metastasized mesenteric lymph nodes taken from 42 gastric cancer cases, 21 nodes (50%) were PAS-positive and the other 21 were PAS-negative. Twenty of PAS-positive 21 cases (95.2%) died within a year, mostly within 6 months after the operation. Sixteen of PAS-negative 21 cases (76.2%) are still alive at the time of writing this paper 12 to 15 months after the operation, the remaining 5 cases (23.8%), however, died within a year after gastrectomy (Table 7).

Table 7. PAS reaction of mesenteric lymph node in gastric cancer and the prognosis

PAS reaction	No. of cases	No. of the death*	No. of survival**
PAS (+)	21	20 (95.2%)	1 (4.8%)
PAS (−)	21	5 (23.8%)	16 (76.2%)

* Patients died within a year after the gastrectomy

** Patients still alive at the moment of observation

iv) Summary

Approximately 80 per cent of the tissue specimens of gastric cancer and metastasized regional lymph nodes showed positive PAS reaction and about 50 per cent of the mesenteric lymph nodes in gastric cancer cases subjected to gastrectomy also showed positive PAS reaction. There exists a significant correlation between the PAS reaction of the mesenteric lymph node in gastric cancer and its prognosis. Most of PAS-positive cases died within a year after the operation.

C. Histological reaction and PAS reaction of the mesenteric lymph node in gastric cancer and the prognosis

Both the histological and PAS reaction of the mesenteric lymph nodes of 42 gastric cancer cases were examined, and the correlation between these reactions and the prognosis was tabulated. As is seen in Table 8, 15 cases of both positive lymph node reaction and

Table 8. Histological reaction and PAS reaction of mesenteric lymph node in gastric cancer and the prognosis

	No. of patients died within a year after gastrectomy		No. of patients surviving 12-15 months after gastrectomy	
	PAS (+)	PAS (−)	PAS (+)	PAS (−)
R(+)F(−) R(+)F(+) R(−)F(+)	15	5	0	2
R(−)F(−)	5	0	1	14

Remarks : Metastasis was not found any of all the lymph node studied

positive PAS reaction died invariably within a year, mostly within 3 months after gastrectomy. Among 13 cases of either positive lymph node reaction or positive PAS reaction, 10 cases (76.9%) died on the average of 4 months after gastrectomy. Fourteen cases of both negative reaction were all surviving at 12 to 15 month observation.

III. Experimental Studies

After the removal of the primary subcutaneous tumor of ascites hepatoma AH 130 in rats, the animals showed different tendencies of further growth of metastatic foci to final death or permanent cure. Reaction of the regional and extraregional lymph nodes in the both groups were comparatively studied with the lapse of time.

1. Materials and Methods

Forty adult male rats of Gifu-strain, weighing 120 to 140 g, were used. Intraperitoneal 6 day growth of transplantable ascites hepatoma AH 130 was used.

A. Experimental Groups

Six to seven million cells of the tumor were inoculated subcutaneously in the left side back of 25 rats. Nine days after the inoculation, at which time the subcutaneous inoculum grew hemispherically to be more than 1 cm in diameter, the tumor was resected and these animals were divided into the following three groups depending upon the size of the left inguinal lymph node and behavior of the lymph nodes and postoperative course were pursued with the lapse of time.

Group I. The left inguinal lymph node was palpable to be greater than 1 cm in diameter.

Group II. The left inguinal node was palpable to be 0.5 cm to 1 cm in diameter.

Group III. The left inguinal node was palpable to be less than 0.5 cm in diameter.

B. Control Groups

The following control groups were studied, since the lymph node reaction might be caused by the protein which is isologous or heterologous to the rat of the experimental groups, or merely by stimulations such as operation.

a) The first group was consisted of 6 rats. They were given subcutaneous injection of 0.3 cc of liver homogenate of normal rat, containing 2 g/dl of protein in centrifugal supernatant, which corresponded to the protein content of the supernatant of the ascitic fluid used for the inoculation, in the left side back ten times every other day and were killed two or five days after the last injection.

b) The secound group was consisted of 6 rats. They were given subcutaneous injection of 0.3 cc of diluted white of an egg, containing similarly 2 g/dl of protein, in the left side back ten times every other day and were slaughtered two or five days after the last injection.

c) The third group was consisted of 3 rats. An incision of approximately 2 cm in length was performed in the left side back and immediately sutured, i. e. group of false operation.

According to the experiment of infusion with Evans blue, the regional lymph node of the main tumor which was located in the left side back of the rat was the left inguinal and left axillar nodes, and the right axillar lymph node belonged to extraregional ones. Accordingly, the left axillar and inguinal lymph nodes were collected and studied histologically as regional ones, and the right axillar lymph node, as extraregional one. As the criterion for the lymph node reaction in this series, that of clinical cases was applied.

Table 9. Lymph node reaction of AH 130-bearing rats

Experimental Groups

Group	Rat No.	Days*	S.A.**	L. Inguinal			L. Axillar			R. Axillar			Remarks
				Met.	R.	F.	Met.	R.	F.	Met.	R.	F.	
I	1	11	dead	##	*	*	##	*	*	##	*	*	Ascites (+)
	2	11	dead	##	*	*	##	*	*	−	−	+	Ascites (+)
	3	16	alive	##	*	*	##	*	*	−	−	+	Ascites (+)
II	4	11	alive	##	*	*	−	+	−	−	−	+	
	5	11	alive	##	*	*	+	−	+	−	−	+	
	6	16	dead	##	*	*	##	−	+	−	−	+	
	7	16	alive	##	*	*	−	+	+	−	+	+	
	8	21	alive	+	+	−	−	+	+	−	−	−	
	9	21	alive	##	−	+	−	−	+				
	10	21	alive	+	−	−	−	−	+				
III	11	11	alive	−	−	−	−	−	−	−	−	−	
	12	11	alive	−	−	−	−	−	−	−	−	+	
	13	16	alive	+	−	+	−	−	+	−	−	+	
	14	16	alive	−	−	−	−	−	−	−	−	−	
	15	21	dead	##	+	−	−	+	−	−	+	+	Ascites (+)
	16	21	alive	+	+	−	−	−	−	−	+	−	
	17	28	alive	−	−	−	−	−	−	−	−	−	
	18	28	alive	−	−	−	−	−	−	−	−	−	
	19	28	alive	−	−	−	−	−	−	−	−	−	

Days* : Duration of time in the term of day between tumor removal and observation. S. A.** state of animal. L. Inguinal : left inguinal node. L. Axillar : left axillar node. R. Axillar : right axillar node. Met. (+) : slight metastasis, Met. (##) : Moderate metastasis, Met. (###) : entirely replaced with metastasis. R. : sinus reticulosis. F. : follicular hyperplasia.

2. Results

A. Expevimental groups

In a single case out of 25, the transplantation was unsuccessful and 5 animals out of 25 died of accidents. Consequently, remaining 19 cases were valid.

Group I (3 rats) ; All the 3 rats died within 16 days after the operation. No reccurrence of the tumor at the location of the former operation was observed. However, the left inguinal and axillar lymph nodes (regional ones) were replaced with the metastatic tumor mass, enlarging to be greater than 1 cm in diameter, which made it incapable to determine the reactivity of the lymph nodes. Animals of this group invariably showed accumulation of carcinogeneous ascitic fluid, which was probably caused by an infiltration into the abdominal cavity of the hepatoma cells which came from the left metastasized inguinal lymph node via the adjacent peritoneum. As regards the extraregional lymph nodes, the reactive pattern was found in the right axillar lymph nodes of 2 cases, in which all the lymph nodes had no involvement of the carcinoma. The right axillar lymph node of remaining 1 animal in this group was entirely replaced with the tumor mass, which, accordingly, refused the observation of the lymph node reaction (Table 9).

Group II (7 cases) ; At the time of the observation, all the rats in this group had almost similarly advanced metastatic tumor in the regional lymph nodes, though revealing a little difference, and were readily presumed to die from tumor growth sooner or later. In the extraregional lymph nodes of these animals, the reactive pattern was almost invariably found (Table 9).

Group III (9 cases) ; In this group, it was found that the left inguinal lymph node

Table 10. Lymph node reaction of the rats

Control Groups

Group	Rat No.	Days*	S.A.**	L. Inguinal R.	L. Inguinal F.	L. Axillar R.	L. Axillar F.	R. Axillar R.	R. Axillar F.
a)	26	21	alive	−	−	−	−	−	−
	27	21	〃	−	−	−	−	−	−
	28	21	〃	−	+	−	−	−	−
	29	24	〃	−	−	−	−	−	−
	30	24	〃	−	−	−	−	−	−
	31	24	〃	−	−	−	−	−	−
b)	32	21	alive	−	−	−	−	−	−
	33	21	〃	−	−	−	−	−	−
	34	21	〃	−	−	−	−	−	−
	35	24	〃	−	−	−	−	−	−
	36	24	〃	−	−	−	−	−	−
	37	24	〃	−	−	−	−	−	+
c)	38	20	alive	−	−	−	−	−	−
	39	20	〃	−	−	−	−	−	−
	40	20	〃	−	−	−	−	−	−

Days* : Duration of time in the term of day between last injection and observation. S. A.** : state of animal. L. Inguinal : left inguinal node. L. Axillar : left axillar node. R. Axillar : right axillar node. R. : sinus reticulosis. F. : follicular hyperplasia.

had decreased its size after the resection of the primary tumor. In 6 cases out of 9, in which no metastasis was found and permanent healing was expected, all the extraregional lymph nodes revealed non-reactive pattern with the exception of only one case. The metastasis in the left inguinal lymph node was found in 3 cases in which all the extraregional right axillar lymph nodes showed the reactive pattern (Table 9).

B. Control groups

In almost all cases of a), b) and c) groups, reactive pattern was not found as represented in Table 10. Some changes were seen in the liver of a) group 5 days after the last injection.

3. Summary

Experimentally, it was demonstrated that there still existed lymph node metastasis after the removal of the primary tumor, and the extraregional lymph nodes of the cases, which were supposed to have unfavorable prognosis, revealed the reactive pattern.

IV. Discussion

It is a problem of utmost importance to have an accurate knowledge of the prognosis of gastric cancer and many investigators have been employed in it. BRODERS[13)14)15)] stated that the higher the degree of differentiation of the cancer cell is, the better the prognosis is. This concept was developed into the idea of "histological malignogram" by HAAGENSEN[21)] and HEUPER[24)]. They all attempted to determine the prognosis merely from the standpoint of cancer cell differntiation and BALFOUR[4)], GREY[19)], PACK[38)] and others approved of BRODERS' classification. On the other hand, PLAUT[40)], LEE[31)], KAJITANI[28)] and the like considered histological differentiation to be quite inadequate for the prognostic criterion and put emphasis on the clinical and local findings. KAJITANI[28)] asserted, in his clinical and pathological studies on prognosis after the radical operation for gastric cancer, that among many other factors, the type of gastric cancer, particularly according to BORRMANN's macroscopical classification, and the stage of cancer advancement as determined by the infiltration of the cancer cells into gastric serosa and the degree of lymph node metastasis, has a definite correlation with the prognosis. IMAI[27)] studied the prognosis following the resection of gastric cancer from the standpoint of histological changes at the marginal area of the tumor in the operation and autopsy series and asserted that his original "CPL-classification" was clinically applicable for determining the prognosis.

On the other hand, there has been an attempt to presume the prognosis of cancer patient by the reaction of the regional lymph nodes. BLACK[8)9)10)11)12)] expected a favorable prognosis for a breast cancer patient and those of gastric cancer which revealed the sinus histiocytosis in the regional lymph node, and an unfavorable prognosis for those which revealed further additional degenerative changes there. He regarded this "sinus histiocytosis" as a histological manifestation of anti-tumor activities of the host. In contrast with this, BERG[5)6)] observed in his detailed studies of breast cancer patients that sinus histiocytosis was not always the sign of favorable prognosis and he found a correlation between favorable prognosis and the finding of the "normal pattern" in the regional lymph node or the round cell infiltration in the periphery of the primary tumor. MOORE[33)], studying breast cancer, and KOBAYASHI[30)], studying uterine cancer, similarly concluded that "sinus

histiocytosis" did not indicate the prognosis. However, OMORI[37] supported BLACK's view on the correlation between the two, in his studies on gastric cancer.

BERG[5] demonstrated that the frequency of sinus histiocytosis in the regional lymph nodes of patient with breast cancer was lower in the metastasized node than in the non-metastasized node closely located to this metastasized node, and that the smaller the area of the metastatic growth in the lymph node was, the higher the frequency of sinus histiocytosis was. IZAWA[26] also reported that sinus histiocytosis was observed in the popliteal lymph node of initial metastasis in rabbits, which had inoculation of Brown-Pearce tumor in the foot sole. TAKAHASHI[41] also reported in his studies of pulmonary tumor production with MH 129P, that sinus reticulosis was observed only when tumor cells were found exclusively in the subcapsular sinus of the hilar lymph node. According to the results of the present experiments in animals, sinus reticulosis was observed in the lymph nodes slightly invaded by tumor cells or non-metastasized extraregional lymph nodes of the animals having invaded nodes within the body. Thus, it might be concluded that sinus histiocytosis or sinus reticulosis is frequently observed in the lymph node invaded with cancer cells or in the adjacent ones to such nodes. The hyperplasia of sinus reticulocytes (sinus reticulosis) discussed here, is regarded to correspond to the sinus histiocytosis postulated by BLACK.

It is widely known that a slight structural variation can be observed in the normal lymph nodes depending on the location, the nutritional condition, the age etc, and the lymph nodes within the abdominal cavity have well-developed medullary cords. It is also said that the lymph nodes tend towards atrophy and degeneration of the secondary center of the follicle as the age of individuals advances[25][36]. These physiological changes are generally present in and around the medullary cord near the hilum. Accordingly, the present study on the lymph node emphasized the change in the subcapsular sinus, intermediate sinus and the cortex close to the capsule. The lymph node is sensitive to various stimuli, showing reaction of follicular or reticular hyperplasia depending upon the character of the stimuli. The reactive pattern of mesenteric lymph node of gastric cancer was reticular hyperplasia in the majority of the cases. On the other hand, it is generally admitted that the reaction of the lymph node in the immunological hypersensitive condition frequently assumes the pattern of reticular hyperplasia[22][25]. ALBERT[1] demonstrated that the breast cancer of mouse has an antigenetic activity against the regional lymph nodes. It might be possible to assume that the reaction of the lymph node observed in the present experiment is of an immunological character, and even so, it is not necessarily assumed to be a favorable reaction to the host[17].

Chronic stimuli other than cancerous one also produce similar patterns of reaction in the lymph node, accordingly, it is practically impossible to exclude pictures of non-specific reactions in the regional lymph nodes in gastric cancer against cancerous ulcer or concomitant gastritis, which are necessarily accompanied in gastric cancer, although these reactions should be excluded as much as possible. The regional lymph nodes of gastric cancer is often invaded with metastasis, the degree of which is various as reported by AONUMA[3]. Such metastasis naturally affects the reaction of the lymph node, therefore, in order to examine many cases from the standpoint of the lymph node reaction under the same condition, cancer free lymph nodes should be studied. This is often difficult because histological

metastasis is so frequent in the regional lymph nodes of gastric cancer and only a limited number of cases admit this selection. In the present experiment, the relationship between the reaction of non-metastasized regional lymph nodes in gastric cancer and the prognosis was studied. However, it was impossible to find any correlation between the two, though this can not be said with confidence since very few cases were available. Subsequently, reaction of the mesenteric lymph nodes from the individual abdominal cavity, which can be readily taken at laparotomy were examined. Furthermore, these nodes are assumed to be much suited to the study on the correlation between the lymph node reaction and the prognosis, since they have an advantage not to be directly influenced by cancerous ulcer or concomitant gastritis, at the same time closely related to the lymphatic system of the stomach in spite of their extraregional location and being highly susceptible to the changes of the intraperitoneal condition. The obtained result suggested the reactive pattern in the cases of unfavorable prognosis. It is also assumed the lymph node reaction is closely correlated with the progress of cancer as classified in the term of "stage", particularly with the degree of peritoneal dissemination, and it is supposed that these lymph nodes readily reflect influences from the peritoneal change.

Recently, there have been numerous discussions concerning the significance of polysaccharides in cancer-bearing organisms. GERSCH[18] demonstrated that abundant glycoprotein was present in fibroblasts of the stroma of rapidly growing transplantable tumors, whereas small amount of the substance was found in the stroma of the slowly growing tumor, and he attributed the cause of this phenomenon to depolymerization of ground substance of stroma caused by the collagenase contained in the tumor tissue. CATCHPOLE[16] demonstrated an increase in glycoprotein in serum of mouse with large tumor and also in the tissue around the tumor. PETERMANN[30] also noticed an increase in the amount of mucoprotein in serum of cancer patients. AOKI[2] stained extended sections of tissues from the neighbouring and the distant portions of the subcutaneous mass of Yoshida sarcoma by the PAS and toluidin blue metachromasia method and demonstrated an increase in water-soluble glycoprotein in the neighbouring portion of the tumor. Thus, he confirmed the results of Gersh's. KIMURA[29] reported that the polysaccharide staining was positive in the stroma of progressive growth of human gastric cancer. TAKAMINE[42] considered this finding of polysaccharide staining in tumor tissue to be the secondary alteration of the stroma reaction. HAKOMORI[23] examined urinary proteins of tumor-bearing animals and found a qualitative change in glycoproteins, which increased due to tumor-bearing. With advancement of cancer growth, increase in γ-glycoprotein, as termed by him, was observed and this substance continuously exerted an anemia-inducing effect. It seems that the amount of polysaccharides in serum of cancer-bearing organisms might be considered to be indicative of the growth of cancer. It was from such concept that the mesenteric lymph nodes were studied with PAS staining method, which is most suited to histochemical demonstration of polysaccharides, in relation to prognosis. The frequency of positive PAS reaction in the mesenteric lymph node was 28 per cent in non-cancerous gastric diseases, while it being 50 per cent in gastric cancer. Furthermore, all of these PAS positive gastric cancer cases died mostly within a year after the operation. This positive PAS reaction may be interpreted as a proof of existence of PAS positive substances in the lymph node which is

observed in the primary gastric cancer, or of polysaccharides increasing in serum originating from the surrounding tissue of the tumor as postulated by Gersch etc., or of depolymerizing enzymes of ground substance as postulated by CATCHPOLE[16] and McCUTCHEON[34].

The similar histological and histochemical reactions as in the regional lymph node were obseved in the extraregional mesenteric lymph node as well and the cases with the reactive pattern had an unfavorable prognosis. These facts show that gastric cancer already exerts some influences even extraregionally at the time of operation and clinically, it has already advanced exceeding the feature of a local disease. This was further proved by our experimental studies in animals, according to the results of which the cases revealed reactive pattern in the extraregional lymph node were considered to die from tumor growth sooner or later, whereas the cases with non-reactive pattern afforded an expectance of permanent healing.

V. Conclusion

As it was assumed difficult to determine the prognosis of gastric cancer merely from the findings of reactive behavior of the regional lymph nodes, the author examined the extraregional mesenteric lymph node and studied the relation between the reaction of the node and the prognosis. It was clinically proved that the mesenteric lymph node indicates fairly accurate prognosis of gastric cancer during the postoperative period of 15 months. Fifty per cent of the cases examined here showed sinus reticulosis and positive PAS reaction. Most of these showed unfavorable prognosis and died within a year after the operation.

Most of the animals thought to die of tumor growth after the resection of the primary tumor revealed reactive pattern in the extraregional lymph nodes.

It was thus assumed that the results of experimental studies also confirm the clinical observations.

The author is greatly indebted to Prof. Dr. ICHIO HONJO for his kind advices and encouragement during the course of the present study, and also grateful to Dr. RYUJI MIZUMOTO for his valuable suggestions and helps and to the members of our clinic for their kind co-operation.

The gist of the present study has already been reported at the 21st and 22nd General Meeting of Japanese Cancer Reseach Association.

VI. References

1) Albert, S., Johnson, R. M. and Pinkus, H. : The effect of transplanted and spontaneous mouse mammary gland carcinomas on lymph nodes. Can. Res., **14** : 710, 1954.
2*) Aoki, S., Ooneda, G., Mochizuki, N., Kobayashi, I. and Hanafusa, A. : Histochemical studies of cancerous tissue. II. GANN, **44** : 122, 1953.
3*) Aonuma, K. : Studies on regional lymph node metastasis in gastric cancer. J. J. S. S., **64** : 710, 1963.
4) Balfour, D. C. : Factors of significance in the prognosis of cancer of the stomach. Ann. Surg. **105** : 733, 1937.
5) Berg, J. W. : Sinus histiocytosis: A fallacious measure of host resistance to cancer. Cancer, **9** : 935, 1956.
6) Berg, J. W. : Inflammation and prognosis in breast cancer. Cancer, **12** : 714, 1959.
7) Billroth, TH. : Offenes Schreiben an Herren Dr. L.Wittelshöfer. Wien. Med. Wschr., **31** : 162, 1881.
8) Black, M. M., Kerpe, S. and Speer, F. D. : Lymph node structure in patients with cancer of breast. Am. J. Path., **29** : 505, 1953.
9) Black, M. M., Opler, S. R. and Speer, F. D. : Microscopic structure of gastric carcinomas and their regional lymph nodes in relation to survival. Surg. Gynec. Obst., **98** : 725, 1954.
10) Black, M. M., Speer, F. D. and Opler, S. R. : Structural representation of tumor-host relationships in mam-

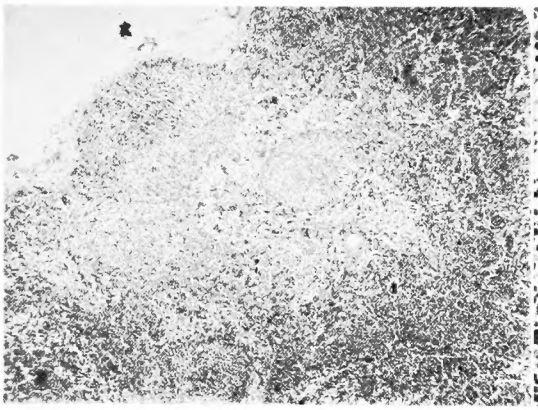


Fig. 8 Non-reactive pattern of the mesenteric lymph node. (H. E. ×100)

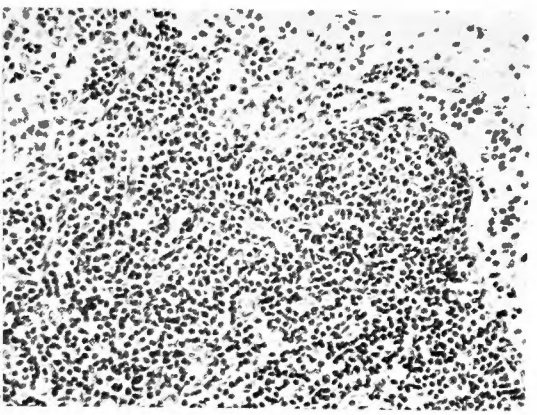


Fig. 9 High-power view of cortical area of Fig. 8 (H.E. ×100)

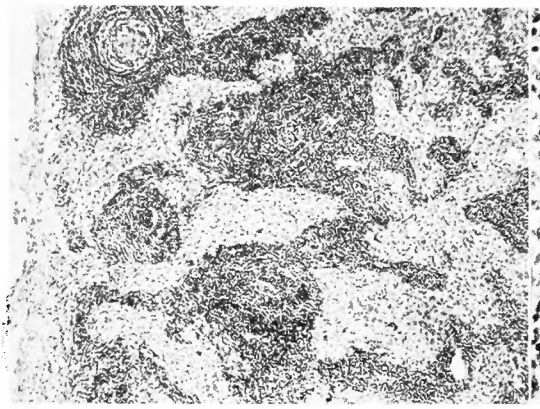


Fig. 10 Reactive pattern of the mesenteric lymph node. Notice the proliferation of sinus reticulocytes (sinus reticulosis). (H. E. ×100)

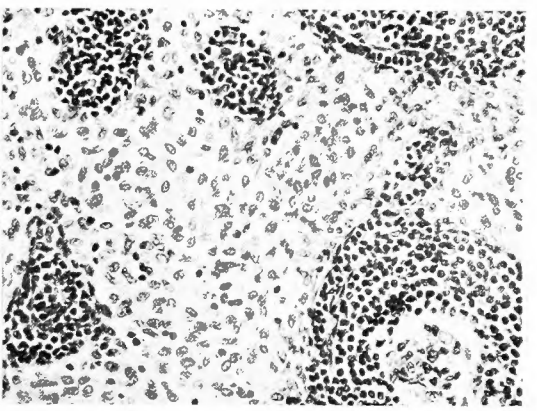


Fig. 11 High-power view of sinus reticulosis. The sinus of Fig. 10 was magnified. (H.E., ×300)

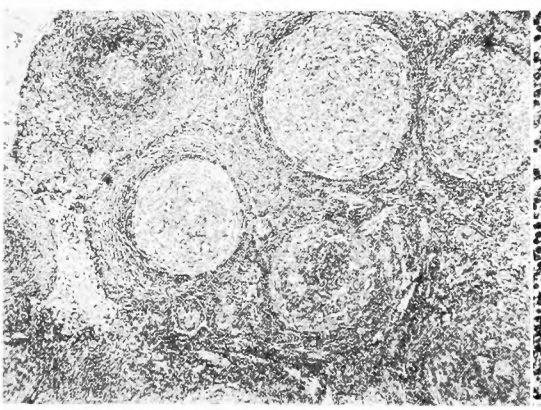


Fig. 12 Reactive pattern of the mesenteric lymph node in gastric cancer, showing increaed number of follicles (follicular hyperplasia). (H.E., ×100)

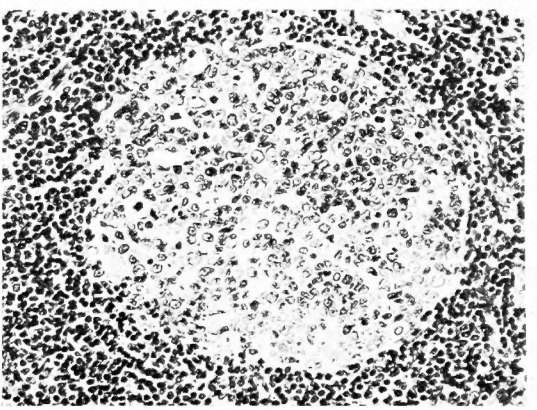


Fig. 13 Hyperplastic secondarry center with mitotic figures. The secondary center of Fig. 12 was magnified. (H.E., ×300)

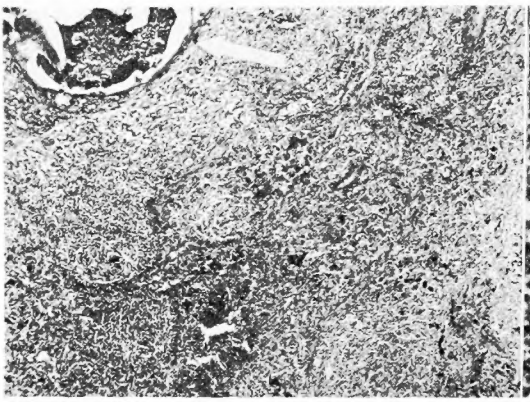


Fig. 14 Lymph node with metastatic adenocarcinoma.
Metastatic focus is indicated with an arrow, tumor cell mass revealing positive PAS reaction. Reticulocytes including phagocytic PAS positive granules are scattered in remaining normal tissue (PAS-staining, ×100)

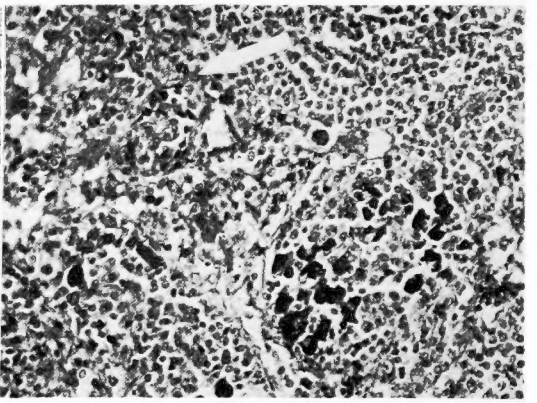


Fig. 15 Lymph node of positive PAS reaction. Magnified enlargement of normal area of Fig. 14, revealing phagocytic PAS positive granules in reticulocytes within follicle in the right lower area. At the same time, homogenous PAS staining of ground substance is shown by an arrow in the left upper area.
(PAS-staining, ×300)

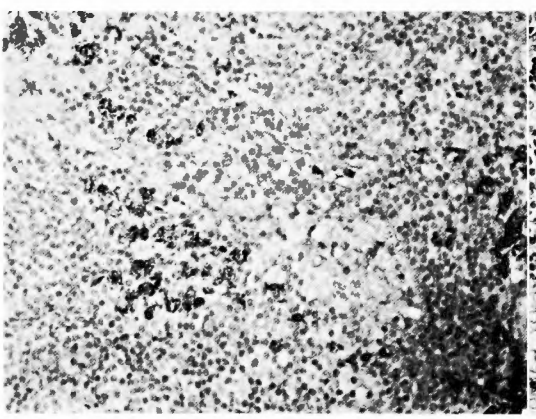


Fig. 16 Mesenteric lymph node of positive PAS reaction, revealing phagocytic picture of rough and strongly PAS positive granules in reticulocytes in marginal area of follicles.
(PAS-staining, ×300)

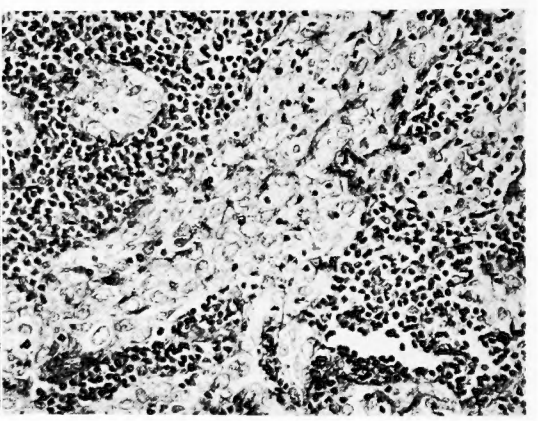


Fig. 17 Mesenteric lymph node of positive PAS reaction, revealing phagocytic picture of rough and strongly PAS positive granules in hyperplastic reticulocytes.
(PAS-staining, ×300)

mary carcinoma ; Biologic and prognostic significance. Am. J. Clin. Path., **26** · 250, 1956.
11) Black, M. M. and Speer, F. D. : Lymph node structure and metalophilia in tumor-bearing mice. Arch. Path., **67** : 58, 1959.
12) Black, M. M. and Speer, F. D. : Lymph node reactivity in cancer patients. Surg. Gynec. Obst., **113** : 477, 1960.
13) Broders, A. C. : Squamous-cell epithelioma of the lip. A study of five hundred and thirty-seven cases. J. A. M. A., **74** · 656, 1920
14) Broders, A. C. : Squamous-cell epithelioma of the skin. A study of 256 cases. Ann. Surg., **37** : 141, 1921.
15) Broders, A. C. : Epithlioma of the genito-urinary organs. Ann. Surg., **75** : 574, 1922.
16) Cathpole, H. R. : Serum and tissue glycoproteins in mice bearing transplantable tumors. Proc. Soc. Exper. Biol. Med., **75** : 221, 1950.
17) Feldman, M. and Globerson, A. : Studies on the mechanism of immunological enhancement of tumor grafts. J. Nat. Can. Inst., **25** : 631, 1960.
18) Gersch, I. and Catchpole, H. R. : The organization of ground substance and basement membrane and its significance of tissue injury, disease and growth. Am. J. Anat., **85** : 457, 1949.
19) Gray, H. K. : Clinical and pathological factors influencing ultimate prognosis following resection for carcinoma of the stomach. Ann. Surg., **97** : 882, 1933.
20) Gummel, H. and Wittig, G. : Über die Notwendigkeit einer Wertbestimmung maligner Tumoren. Chirurg., **31** : 448, 1960.
21) Haagensen, C. D. : The basis for the histologic grading of carcinoma of the breast. Am. J. Can., **19** : 285, 1933.
22*) Hanaoka, S. : An interpretation of runt disease. Saishin Igaku, **17** . 2915, 1962.
23*) Hakomori, S. : On signifidance of κ-, γ-mucopolypeptide and γ-glycoprotein in cancer bearing individuals. Jap. J. Can. Clin., **7** : 81, 1961.
24) Heuper, W. C. : Carcinomas of the uterine cervix. Their histologic structure, malignancy and prognosis. Arch. Path., **6** : 1064, 1928.
25*) Horii, I. : Structure and differentiation of lymph node. Saishin Igaku, **16** : 157, 1961.
26*) Izawa, T. · Experimental studies on metastasis of Brown-Pearce rabbit cancer to lymph nodes. GANN, **53** : Suppl., 233, 1962.
27*) Imai, T. : The growth of human carcinoma. A morphological analysis. FUKUOKA ACTA MEDICA, **45** : 72, 1954.
28*) Kagitani, T. and Hoshono, T. : Studies on the prognosis of gastric cancer. SOGO-IGAKU, **12** : 555, 1955.
29*) Kimura, T. : Tumor growth and stromal polysaccharides of gastric carcinoma. Shinshu Med. J., **4** : Suppl. of No. 1, 160, 1955.
30*) Kobayashi, T., Takeuchi, S., Matueda. K., Toyoshima, K. and Izumi, R. : Study on metastasis of uterine cervical cancer. GANN, **52** : Suppl., 114, 1961.
31) Lee, B. J. and Stubenbord, J. G. : A clinical index of malignancy for carcinoma of breast. Surg. Gynec. Obst., **47** : 812, 1928.
32) Marshall, A. H. E. : Chronic inflammation of lymph nodes. An outline of the cytology and patholgy of the reticular tissue. pp. 120, Oliver and Boyd. London, 1956.
33) Moore, R. D., Chapnick, R. and Schoenberg, M. D. : Lymph node associated with carcinoma of the breast. Cancer, **13** : 545, 1960.
34) McCutcheon, M. and Coman, D. R. : Spreading factor in human carcinomas. Can. Res., **7** : 379, 1949.
35*) Okabayashi, A. : An introduction to disease caused by immunological antibodies. Saishin Igaku, **17** : 2835, 1962.
36*) Ozogoshi, F. : Lymph node. Textbook of Histology, pp 381, Igaku shoin, Tokyo, 1962.
37*) Omori, Y. and Fujimaki, Y. : Metastasis and host-reaction. With special reference to stomach cancer. Gann no Rinsho, **6** : 467, 1960.
38) Pack, G. T. and McNeer, G. : End results in the treatment of cancer of the stomach. Analysis of seven hundred ninety-five cases. Surg., **24** : 769, 1948.
39) Petermann, M. L., and Hogness, K, R, : Electorophoretic studies on the plasma proteins of patients with neoplastic disease. II. An acid protein present in the plasma. Cancer, **1** : 104, 1948.
40) Plaut, A. : The relation of prognosis to the histological findings in carcinoma of the cervix. Surg. Gynec. Obst., **43** : 450, 1926.
41*) Takahashi, T. and Sato, H. : Intrapulmonal tumor growth by means of intranasal inoculation of tumor cells. GANN, **53** : Suppl, 234, 1962.
42*) Takamine, S. : Studies of the polysaccharides on cancer tissue with special references to the reaction of the interstital tissue. GANN, **45** : 242, 1954.
(* written in Japanese)

和文抄録

胃癌における腸間膜リンパ節の反応と予後

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西尾 功

最近，host-tumor relationshipの立場から癌患者の予後を窺知せんとする試みがなされている．即ちBlackは主として乳癌症例で，領域リンパ節にsinus histiocytosisの認められるものでは予後良好で，これに退行性変化の加わつたものでは予後不良であると述べて以来，内外で多数の追試研究がなされ，賛否両論の存するところである．私も胃癌症例において，その領域リンパ節の反応態度と予後との関係を検索したが，両者の間に相関を認めることが出来なかつた．そこで，胃癌手術時容易に採取出来，又胃領域外と考えられ，しかも腹腔内の病変によく反応すると思われる下部腸間膜リンパ節を採取し，ヘマトキシリン・エオヂン（H.E.）染色及びperiodic acid-Schiff（PAS）染色を行なつて，その反応態度と予後との関係を検索し，次の結果を得た．

尚，リンパ節反応の判定基準としては，H.E.染色標本では，周縁洞及び中間洞内の細網細胞の増生（sinus reticulosis）又は，核分裂の著明な二次中心を伴なつた濾胞の肥大，増殖像（follicular hyperplasia）に着目し，これらのいづれか一方でも認められるものをリンパ節反応陽性，両者共に認められないものを反応陰性とした．又，PAS染色標本で，PASに強染する粗大顆粒を喰喰した細網細胞が洞内，濾胞内に増多しているもの，又は洞内細網線維及び線維間基質がPASに強染しているものをPAS陽性とし，これらのいづれも認められないものをPAS陰性とした．

結　果

1） 同一個体の腸間膜リンパ節の採取部位による反応の相違をみるために，胃良性疾患25例につき，トライツ氏靱帯より肛門側2.5m（上）と3.5m（下）の腸管に相当する部位の腸間膜リンパ節を各1個宛採取し，上下の反応の相違を比較検討したところ，同一所見を示すものが大部分（84%）であつた．特に下部腸間膜リンパ節では，胃良性疾患による影響が少なく，殆んど反応陰性であつた．

2） 胃切除を行ない得た胃癌症例49例を下部腸間膜リンパ節の反応態度から (1) 転移群，(2) 非転移反応陽性群，(3) 非転移反応陰性群に分類し，各群の予後につき検索したところ，(1) 転移群は7例全例術後7ヵ月以内に死亡し，(2) リンパ節反応，PAS反応共に陽性のものは15例全例術後1年，多くは3ヵ月以内に死亡し，これらの反応のどちらか一方が陽性であつた13例中，10例（76.9%）は術後平均4ヵ月以内で死亡しているが，(3) 両反応共に陰性の場合は，14例全例術後12乃至15ヵ月の今日も尚生存中である．

リンパ節反応陽性のうち，follicular hyperplasiaよりもsinus reticulosisの方が予後との関係が深かつた．

3） これらの腸間膜リンパ節反応陽性は，胃癌研究会の胃癌進展度“Stage”による分類でも，より高度進展胃癌に多く認められた．なかでも腹膜播種度及び肝転移度との関連が深かつた．

4） ラットの腹水肝癌AH 130の皮下腫瘍を切除すると，リンパ節転移巣の発育により死亡，或いは早晩死亡すると考えられる群と自然治癒にむかつた群とに分けられたが，前群では非転移領域外リンパ節にfollicular hyperplasia又はsinus reticulosisが殆んど全例に認められたのに対し，後群ではこれらのリンパ節反応が殆んど陰性であつた．

以上の結果から，臨床的に，胃癌の下部腸間膜リンパ節の反応は予後とよく相関し，sinus reticulosis及びPAS反応陽性を示すものは予後が悪く，殆んどが術後1年以内に死亡した．又，同リンパ節の反応が陰性で，ほぼ正常構築を保つているものは，胃切除後12乃至15ヵ月の現在尚生存中であり，このうち，特に治癒手術を行ない得たものでは予後に期待がもてるものと思われる．これらのことは，実験的にも確かめることが出来た．